

What is claimed is;

1. A semiconductor laser device comprising:

a substrate, a semiconductor layer including an active layer, a cladding layer, and a contact layer stacked in the recited order;

5 two exposed portions having a depth at which said semiconductor layer is exposed continuously from one of two resonator end faces to the other; and

10 a ridge portion, formed between said two exposed portions, which has a current injection window;

15 wherein in at least one of the resonator end faces of said ridge portion, a portion of said contact layer near said one resonator end face is removed;

an insulating film is formed so that it covers a region, excluding said current injection window, of said contact layer, and portions of said cladding layer exposed by removing the portion of said contact layer near said one resonator end face; and

20 an electrode is formed on at least a portion of said contact layer exposed to said current injection window.

25 2. The semiconductor laser device as set forth in claim 1, wherein the uppermost layer of said semiconductor layer in a stacking direction is an etch-stopping layer, said cladding layer is provided on said etch-stopping layer, and a layer exposed to the bottom portions of said two exposed portions is said etch-stopping layer.

3. The semiconductor laser device as set forth in  
claim 1, wherein said cladding layer comprises AlGaAs and said  
contact layer comprises GaAs.

4. The semiconductor laser device as set forth in  
5 claim 2, wherein said cladding layer comprises AlGaAs and said  
contact layer comprises GaAs.

5. The semiconductor laser device as set forth in  
claim 2, wherein said etch-stopping layer comprises InGaP.

10 6. The semiconductor laser device as set forth in  
claim 2, wherein said cladding layer comprises AlGaAs, said  
contact layer comprises GaAs, and said etch-stopping layer  
comprises InGaP.

15 7. The semiconductor laser device as set forth in  
claim 2, wherein another cladding layer is provided underneath  
said etch-stopping layer, is the same in conductivity and nearly  
the same in refractive index as said cladding layer, and has  
a lattice match with respect to said substrate.

20 8. The semiconductor laser device as set forth in  
claim 1, wherein a side face of said contact layer exposed to  
said exposed portion is situated inside an edge of a top surface  
of said cladding layer exposed to said exposed portion.

25 9. The semiconductor laser device as set forth in  
claim 1, wherein the portion of said contact layer near said  
resonator end face, which is removed, is in a range between 5  
μm and 50 μm, from said one resonator end face.

10. A method of fabricating a semiconductor laser

device, comprising the steps of:

stacking a cladding layer and a contact layer on a semiconductor layer including an active layer, in the recited order;

5 forming a photoresist film, which has two windows extending from one of two resonator end faces to the other, on said contact layer through a mask, and then etching said cladding layer and said contact layer to form two grooves, corresponding to said two windows, and a ridge portion between said two grooves;

10 forming a window in at least a portion of said photoresist film near one of the two resonator end faces of said ridge portion through a mask, and then selectively etching and removing a portion of said contact layer which is near said one resonator end face; and

15 lifting off and removing said photoresist film.

11. The method as set forth in claim 10, wherein said cladding layer comprises AlGaAs, said contact layer comprises GaAs, and said contact layer is etched with an  $\text{NH}_3:\text{H}_2\text{O}_2$  mixed water solution.

20 12. A semiconductor laser device comprising:

two opposite resonator end faces where at least a first conduction type first cladding layer, a first conduction type or i-type first optical waveguide layer, an i-type  $\text{In}_{x_2}\text{Ga}_{1-x_2}\text{As}_{1-y_2}\text{P}_{y_2}$  first barrier layer having tensile strain (where  $x_2/0.49 \leq y_2 \leq 0.3 + (x_2/0.49)$ , and  $0.8 \leq y_2 \leq 1.0$ ), an i-type  $25 \text{In}_{x_3}\text{Ga}_{1-x_3}\text{As}_{1-y_3}\text{P}_y$  quantum well active layer (where  $0.3 \leq x_3 \leq 0.2$

and  $y_3 = x_3/0.49$ ), an i-type  $In_{x_2}Ga_{1-x_2}As_{1-y_2}Py_2$  second barrier layer having tensile strain (where  $x_2/0.49 \leq y_2 \leq 0.3 + (x_2/0.49)$ , and  $0.8 \leq y_2 \leq 1.0$ ), a second conduction type or i-type second optical waveguide layer, a second conduction type second cladding layer, a second conduction type contact layer, are stacked on a first conduction type GaAs substrate in the recited order:

wherein said first cladding layer and said second cladding layer comprise compositions which have a lattice match with respect to said GaAs substrate, respectively;

said first optical waveguide layer and said second optical waveguide layer comprise compositions which have a lattice match with respect to said GaAs substrate, respectively;

the total thickness of said first barrier layer and  
said second barrier layer is between 10 nm and 30 nm;

said first barrier layer and said second barrier layer have tensile strains with respect to said GaAs substrate, respectively, and comprise a composition in which the product of a tensile strain quantity common to said two barrier layers and said total thickness is between 0.05 nm and 0.2 nm;

said quantum well active layer comprises a composition which has a lattice match with respect to said GaAs substrate or composition which has a tensile strain of - 0.007 with respect to said substrate; and

a current non-injection region is provided near at least one of said two opposite resonator end faces.

13. The semiconductor laser device as set forth in  
claim 12, wherein

5           said current non-injection region is formed by  
removing at least a portion of said contact layer that is near  
said one resonator end face;

10           an insulating film is formed from the remaining  
contact layer on said second cladding layer to said second  
cladding layer exposed to said current non-injection region,  
a current injection window is formed by removing a portion of  
said insulating film to inject current; and

15           an electrode is formed on a portion of said insulating  
film other than said current non-injection region so that it  
covers at least said current injection window.

14. The semiconductor laser device as set forth in  
claim 12, wherein said contact layer comprises GaAs and said  
cladding layer has a composition that is not etched by an etchant  
for GaAs.

20           15. The semiconductor laser device as set forth in  
claim 13, wherein said contact layer comprises GaAs and said  
cladding layer has a composition that is not etched by an etchant  
for GaAs.

16. The semiconductor laser device as set forth in  
claim 12, wherein said current non-injection region is formed  
in a range between 5  $\mu\text{m}$  and 50  $\mu\text{m}$ , from said resonator end face.

25           17. A solid-state laser apparatus comprising:  
an excitation light source; and

a solid-state laser crystal for emitting laser light  
by being excited with excitation light emitted from said  
excitation light source;

5       wherein said excitation light source comprises the  
semiconductor laser device as set forth in claim 1 or 12.

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